REMARKS

In the Office Action dated July 20, 2004, the Examiner did not enter proposed amendments to claims 1, 7, and 14-20. The Applicant has resubmitted the amendments to these claims along with additional amendments to claims 3, 4, 17, and 20, in conjunction with an RCE. The Applicant submits that these minor amendments and corrections herein are made without prejudice as to patentability, including the doctrine of equivalents, and no new matter has been added.

Claims 1-20 are Not Indefinite

In paper number 5, the Examiner rejected Claims 1-20 under 35 U.S.C. 112, second paragraph, for the first time as being indefinite stating that "the selecting is unclear because the selecting process is inferred." The Applicant has amended claims 1, 15, and 18, to prevent any such further objection. The claims should be in allowable form. The Applicant respectfully requests the Examiner withdraw the rejection. Note, because this rejection was made for the first time in paper number 5, and was not a result of changes made in any amendments, paper number 5 should not be made final.

Claims 1-20 are Nonobvious

In paper number 5, the Examiner rejected Claims 1-20 under 35 U.S.C. 103(a) as being unpatentable over Wiener (U.S. Patent No. 5,524,679) in view of Huang (U.S. Publication No. 2002/0078138). Applicant respectfully disagrees.

With reference to Figures 1-4, the Applicant's invention defined by the claims includes a multi-redundant inlaid wiring system for a vehicle, such as, for example, aircraft 11 (Figure 1). Aircraft 11 includes an outer structure 13, 15, having a composite fabrication assembly 59 (Figures 3 and 4) made of a plurality of layers 61, 65, of composite materials for connecting components 27, 39, adjacent the structure for sending and receiving transmittable information between the components 27, 39. The wiring system of the subject invention provides multiple

pathways for the conveyance of electrical/optical signals throughout the wiring network (Figure 2) of the aircraft 11.

The wiring system includes a plurality of electrical or optical conductive conduits 25 placed between layers 61, 65, of the assembly. The layers 61, 65, are preferably of a fabric made of woven, high-strength fibers, impregnated with resin. A first and a second gateway 23, 29 preferably in the form of computer-controlled selector buses (Figure 2) and preferably also positioned between the layers 61, 65 (Figures 3 and 4), are connected to opposite ends of each of the conduits 25 for selecting at least one of the conduits 25 from a number of possible conduits 25 for communication between the gateways 23, 29. The gateways 23, 29, are connected to various components 27, 39, and controllers 17, 33, through wires 21, 37, 31, 35.

A gateway controller such as wiring computer or server 41 (Figure 2) is electrically or optically connected to at least one of the gateways 23, 29. In an embodiment of the present invention, wiring computer 41 is connected to at least one of the gateways 23, 29, through its own set of wires 43, 51, conduits 47, and gateways 45, 49 to control the gateway(s) 23, 29. That is, the wiring computer 41 can instruct at least one of the gateways 23, 29 to select one of the conduits 25, such as conduit 53 or 55, to carry transmittable information over the selected conduit 25 between controller-component combinations, such as, cockpit controller 17 to wing controller 33 and wing component 27 to cockpit component 39. *See* Application, page 8, lines 23-31. If wiring computer 41 determines that conduit 53 or 55 is damaged or otherwise unusable, the computer 41 can instruct gateways 23, 29, to shift the power or grounding functions to an alternate conduit 25, for example, conduit 57. *See* Application, page 7, lines 24-26. Likewise, if a data wire 47 is damaged, computer 41 can cause gateways 45, 49, to select an alternate data wire 47. *See* Application, page 7, lines 24-26.

Wiener describes a woven structure (Figure 1) in which optical fibers 12 and electrical conductors are woven into a grid-like mat. Referring to col. 2, line 52 to col. 3, line 26, and col. 4, line 61 to col. 5, line 11, the optical fibers 12 are positioned in channels in a warp direction between supporting strands 10, 11, woven in both warp and woof directions, respectively. The structure is manufactured using conventional weaving equipment by positioning both the optical fibers 12 and a non-optical warp strands 10 to and then weaving the woof strands 11 into place without causing micro-bends or discontinuities in the optical fibers 12. Referring to col. 5, lines

32-35, the woven grid-like mat can then be coated with a coating 20 to hold the optical fibers 12 in place. Referring to col. 3, lines 55-65, Wiener also teaches connectors having openings for accommodating the fiber optics and having electrical contacts to couple with any electrical conductors woven within the grid-like mat. Referring to col. 8, lines 29-40, Wiener describes an interconnect device which combines an array of electrical "sources" and an array of optical "detectors." Referring to col. 8, lines 52-55, Wiener teaches, without further description, that switching, addressing, and gating elements *may* be incorporated in the interconnect device. Components 15 (Figure 7) are mounted atop or proximate to the optical fibers.

Wiener does not describe a wiring *network* as featured in independent claim 1 or a wiring *system* for an aircraft as featured in independent claims 15, and 18. Wiener does not describe a plurality of conductive conduits placed *between* layers of a fabrication assembly as featured in said claims, but instead teaches weaving the optical fibers 12 into a grid-like mat (Figure 1) using a weaving process. Wiener also does not describe a gateway placed *between* layers of the fabrication assembly, but instead describes an interconnect (Figure 8) externally connected to the woven structure. Wiener further does not describe gateways or gateway means positioned to select one of said conduits. Nor does Wiener describe means for controlling selecting one of the conduits, or a server to instruct a gateway to do so.

Huang, introduced by the Examiner solely for the purposes of disclosing a "controller for selecting a conduit from among the plurality . . .," describes a control system architecture for a multi-component armament system. More specifically, referring to paragraph 0044 and Figures 4 and 5, Huang describes a plurality of armament component nodes (components) 62 connected to an intranet 60 in a hierarchical multi-tier arrangement. Communications over the intranet 60 are accomplished using a (TCP/IP) client/server communications scheme having a Web-like typography, as opposed to connecting each of the armament component nodes using a point-to-point communications scheme of a common or single bus architecture, such that communications can be passed among different components within the multiple tiers of the intranet until they arrive at their intended destination.

Huang does not describe means for controlling selecting or a server to instruct a gateway to select one conduit from among a plurality of conductive conduits. In fact, Huang does not teach or suggest a first and second gateways or gateway means attached to opposite ends of each

of a plurality of conduits for selecting among the conduits, and thus, cannot teach or suggest a controller to control said gateways.

Neither Wiener nor Huang are Analogous Art

Both Wiener and Huang are inappropriate references because both are not analogous art. Regarding Wiener, though arguably Wiener teaches a structure that can be used in wiring networks, one skilled in the art would not reference such patent in an attempt to build the Applicant's claimed invention. Wiener specifically teaches away from use of "optical fibers disposed inside a laminated structure" because "the laminated structure causes the fibers to kink during curing, creating losses as well as having other disadvantages . . . ." *See* Wiener, col. 2, lines 21-33, 37-40. Wiener provides no teaching of how to form a structure having conductive conduits placed between layers of composite material. Wiener instead teaches optical fibers positioned and held in a grid-like mat woven of fibers of supporting material. *See* Wiener, col. 2, lines 52-54, and Figure 1. Thus, one skilled in the art would not find this reference reasonably pertinent, and therefore, it would not be analogous art. *See In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). Note, Wiener (Int. Cl. D03P 15/00) is assigned a very different classification than that of Applicant (Int. Cl. G06F 13/00) due to the significant differences in structure.

Regarding Huang, though arguably Huang teaches a network topography, one skilled in the art would also not reference such patent in an attempt to build the Applicant's claimed invention. Huang does not teach details of the type of wiring structure used in its data connection 66 or control signal connection 68 but instead describes a general typography of a system made of end components 62, which can serve as clients and/or servers in an intranet environment. *See* Huang para. 0044-0045, and Figure 5. Huang also specifically teaches away from utilizing a redundant bus-type structure typography that uses a system controller to regulate flow of information in the system. *See* Huang, para. 0042. Huang instead teaches a client-server architecture where all armament components 62 are connected to a Web-like intranet 60, each end component forming a client-server relationship with other components. *See* Huang, para. 0043 and Figure 4. Thus, one skilled in the art would not find this reference reasonably pertinent, and therefore, it would not be analogous art.

Applicant, therefore, respectfully submits that all claims should be deemed allowed because both (or either) of the references are not analogous art.

No Prima Facie Case of Obviousness Was Established

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The Examiner failed to factually support each element of the *prima facie* case of obviousness.

No Suggestion or Motivation to Combine References

Regarding the first element of the *prima facie* case, the Examiner states that "[i]t would be obvious to combine Huang with Wiener because Wiener teaches the use of her invention . . . [in a system] such as the system of Huang" and that Huang discloses the details neglected by Wiener and teaches the advantages, including ease of configuration and robustness, of a particular means of conduit selection in a . . . network such as that of Wiener. *See* paper 5, page 3. In fact, Huang teaches away from the use of point-to-point communications schemes such as that described by Wiener. Specifically, Huang teaches away from point-to-point communications schemes where a user interface component is connected directly through a single or common bus 58 to an armament component node 52, the system controlled by a system controller 54. *See* Huang, para. 0042 and Figure 3. Wiener arguably may be a suitable substitute for that "single" or "common" bus which Huang has described as unacceptable due to the requirement for significant modification and adjustments when adding a new component to the system. *Id.* Thus, Huang clearly teaches away from using Wiener as its basis for a network or system.

The Examiner states, however, that "Huang appears to be ready-made to apply to Wiener . . . and that Huang teaches how to use networks with redundant pathways...." *See* paper 5, page 15, lines 1-7. Arguably, a separate Wiener invention may be used for each data connection 66 or control signal connection 68 (Huang, Figure 3). Using Wiener, however, other than strictly as such a control or data bus 66, 68 within the Huang topography, would destroy the benefits of the Huang's web-like client-server node topography. Further, even if Wiener were used, each separate Wiener invention would only be either classified as usable or not usable depending upon whether data or communication signals were received by the destination client/server. No controller is taught or suggested that would select or deselect *individual* conductors within the Wiener invention when such communication is determined to have not been received. As stated above, Huang teaches against using a single or common bus topography such as that arguably described by Wiener. Thus, there is no suggestion or motivation to combine references. Further, even if the references could be combined, the combination would not result in the Applicant's claimed invention.

No Reasonable Expectation of Success

The prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Though arguably, Wiener could be combined with Huang to produce a Huang invention using a separate Wiener invention for each data connection 66 or control signal connection 68, this would not produce the Applicant's invention, but would instead produce a Huang invention. As will be described later, this combination still does not produce a network or a system having a control or controlling means to select individual conductors conduits from a plurality of said conduits.

The References Do Not Teach or Suggest All Claim Limitations

Regarding a comparison of Wiener to the first element of each of the Applicant's independent claims, Wiener does not describe a plurality of conductive conduits placed *between* layers of a composite materials as featured in said claims, but instead teaches weaving the optical fibers into a grid-like mat (Figure 1) using a weaving process. Thus, this element is lacking.

The Examiner argues that because Wiener describes coating its grid-like mat structure with a coating material 20 to hold the fibers in place once the structure has been woven with the optical fibers in position, Wiener somehow also teaches or suggests a plurality of conductive conduits placed between layers of composite materials, "and that the 'mere' coating [20] forms the layers, which the conduit layer is in between." *See* paper 5, page 8, lines 11-19. Reviewing Figure 3 and referring to col. 5, lines 23-25, and 34-37, the grid-like mat is made of: optical fibers 12, warp strands 10, woof strands 11, and a coating 20 to hold the optical fibers in position, prevent moisture, and add rigidity to the structure. Referring to col. 5, lines 31-34, the coating 20 which is identified as "consisting of a well-known material such as an elastomer, a rubbery epoxy, or other suitable material," does not form separate layers of composite material such that a plurality of conductive conduits can be placed between such layers.

In fact, in an embodiment of Applicant's invention, fabric layers 61, 65, can have resin (e.g. epoxy) either pre-impregnated or applied through other processes. *See* Application, page 7, lines 32-34. One skilled in the art would understand that each fabric layer is still only a single fabric layer regardless of the use of resin. Neither Applicant's resin nor Wiener's coating 20 forms a new layer as eluded to by the Examiner (with respect to the Wiener invention, paper No. 5, page). Adding coating 20 is simply part of forming the Wiener single weave layer. Further, any question as to whether Wiener teaches or suggests a multi-layer structure vs. a single layer structure can be resolved by reviewing the background section, col. 2, lines 29-32, where Wiener teaches away from use of laminated (multi-layer) structures. Specifically, Wiener teaches away from embedding optical fibers between laminated structures. *See* Wiener, col. 2, lines 16-19, and 29-32. The purpose of the coating 20 (and resultant structure formed therefrom) is not to form a multiple layer structure, but to hold the optical, woof, and weave fibers, in place either rigidly or flexibly, depending upon the type of coating used. *See* Wiener, col. 5, lines 23-37. Thus, as neither Wiener nor Huang teach or suggest a plurality of conductive conduits placed between layers of a composite material, each and every claim limitations is not taught or suggested.

Wiener further does not describe, teach, or suggest gateways or gateway means positioned to select one of said conduits, as featured in each of the independent claims. The Examiner states that Wiener discloses "first and second gateways (col. 8, lines 10-13)." *See*

paper 5, page 3. Actually, Wiener only describes active interconnects which may include "gating elements." *See* Wiener, col. 8, lines 47-54. No other description of the "gating elements" is provided. The Examiner further states that col. 8, lines 10-19 describes "redundant means for transmission of information." *See* paper 5, page 9, lines 2-3. The Examiner uses this to support a premise that the "gating elements" function to or are positioned to select one of the conduits (from the plurality of conductive conduits) for communication between gateways.

Because Wiener describes having multiple optical fibers, Applicant concedes that arguably the same signal could be passed simultaneously over multiple optical fibers to provide a "redundant means for transmission of information" as identified by the Examiner. Having such feature, however, does not teach or suggest a gateway-type structure capable of individually *selecting* one of the conduits for such transmission, as featured in Applicant's independent claims. Thus, as neither Wiener nor Huang teach or suggest a first and a second gateway or gateway means for selecting one of the conduits from a plurality of conduits, each and every claim limitations is not taught or suggested.

Neither Huang nor Wiener describe, teach, or suggest means for controlling selecting one of the conduits, as featured in independent claims 1 and 15, or a server positioned to instruct at least one of the gateways to select one of the conduits from the plurality of conduits, as featured in Claims 12 and 18. The Examiner concurs that Wiener does not teach or suggest such structure. *See* paper 5, page 10. The Examiner, however, states that "Huang discloses a controller for selecting a conduit from among the plurality . . . ." *See* paper 5, page 3. Huang does not, however, teach or suggest such a controller. Huang solves its problems of loss of a node (component), or communication therewith, by allowing server functions to be handed down from a server towards the top of a hierarchy to a client (component) lower in the hierarchy. *See* Huang, para. 0044, last 5 lines of left-hand col. of page 4. No such controlling means is needed, taught, or suggested, for controlling specifically selecting one of the conduits from the plurality of conduits in an assembly by a gateway or gateway means, as featured in independent claims 1 and 15. Nor is a server that is connected to at least one of the gateways to select one of the conduits from the plurality of conduits, as featured in claims 12 and 18. Thus, as neither Wiener nor Huang teach or suggest means for controlling selecting one of the conduits from a plurality

of conduits by a gateway or gateway means, or a server to do so, each and every claim limitations is not taught or suggested.

Further, neither Huang nor Wiener disclose, teach, or suggest a structure whereby each gateway is placed between layers of the plurality of layers of composite materials of the assembly, each gateway having the respective conduit end attached to the gateway within the layers, or such embedded gateway structure including a terminal for connecting a component to the gateway externally of the layers, as featured in claim 6. The Examiner states that "Wiener . . . discloses [that] each gateway is placed between layers of the assembly," citing Wiener, col. 8, lines 29-40. The referenced passage introduces an optical interconnect assembly, but does not describe any gateways or gateway elements positioned *between* layers of composite material. Besides the fact that the Wiener structure is a single layer structure (*see e.g.* Figure 1), and thus, supplies no layers for any gating elements to be positioned in-between, Figure 8 specifically shows a connector 134 connected external to or on an outer surface of the Wiener grid-like mat structure. As Wiener explicitly shows a location for its interconnects having "gating elements," one skilled in the art would not assume their existence within the weave of the Wiener grid-like mat, but likely would assume their existence in the external connector 134, if so existing. Thus, as neither Wiener nor Huang teach or suggest a structure having gateways embedded between layers of a composite materials of an assembly, each and every claim limitation is not taught or suggested.

Argument Summary

Both (or either) of the references are not analogous art. Also, Huang teaches away from the use of Wiener. Additionally, Wiener teaches away from a multi-layered structure such as that of the Applicant. Further, the combination of Huang and Wiener did not result in Applicant's invention. Finally, neither Wiener nor Huang nor the combination thereof teach or suggest each and every element of at least claims 1 or 15, 6, and 12 or 18. Applicant therefore respectively requests allowance of claims 1-20.

CONCLUSION

In view of the amendments and remarks set forth herein, Applicant respectfully submits that the application is in condition for allowance and favorable action is respectfully requested.

Respectfully submitted,

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